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The *Holopogon* Complex of North America, Excluding Mexico, with the Descriptions of a New Genus and a New Subgenus (Diptera, Asilidae)

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INTRODUCTION

To date a total of eight valid species of asilids from the United States and Canada have been placed in the genus *Holopogon*. When Back wrote the first key to the *Holopogon* of the United States in 1909, there were three named species, and he described three more. One of these, *Holopogon umbrinus*, is being made the genotype of the new subgenus *Dasyholopogon*. In 1923 Curran described a new species from British Columbia and a second from Ontario, *Holopogon tibialis*. The latter species proves to be a synonym of *Holopogon phaeonotus* Loew. Cole added the eighth species to the genus in 1924. In 1934 Bromley described a unique species from Texas, which is being made the genotype of the new genus *Hadrokolos*. The present writer is adding nine hitherto undescribed species to the genus *Holopogon*. This makes a total of 17 species of *Holopogon* in the United States and Canada. Engel (1938, pp. 374–386) lists 23 species from the Palearctic region.

In addition to these species, Williston (1900, p. 306) has described three species from southern Mexico. These species have been included

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in the key to *Holopogon* on the basis of Williston's descriptions. As the types are in the British Museum, they have not been studied by the writer. A series of specimens from Arizona and three specimens from central Mexico that are close to Williston's species are at hand. They are related to, but are not true, *Holopogon*.

ACKNOWLEDGMENTS

The writer, in making these studies, is indebted to many colleagues for their aid. I wish to thank and acknowledge the assistance of these people: Mrs. Lucy D. Beamer and the late Dr. R. H. Beamer; Dr. C. H. Curran, the American Museum of Natural History; Dr. W. W. Wirth, United States National Museum; Dr. Henry Dietrich, Cornell University; Dr. E. A. Pritchard, University of California at Berkeley; Mr. A. T. McClay, University of California at Davis; Dr. H. C. Severin, South Dakota State College; Dr. E. S. Thomas and Mr. R. M. Goslin, the Ohio State Museum; Mr. Joseph Wilcox, United States Department of Agriculture, Whittier, California; Dr. E. H. Strickland, University of Alberta; and Dr. G. F. Knowlton, Utah State College.

The writer thanks the following for comparing specimens with the type specimens in their charge or for the loan of type specimens: Dr. S. L. Tuxen, Universitetets Zoologiske Museum, Copenhagen, Denmark, kindly compared a series of unknown *Holopogon* specimens with the two type specimens of *Holopogon guttula* (Wied); Dr. J. R. Vockeroth of the Canadian National Museum has ably and patiently helped to solve the identity of both *Holopogon albipilosus* Curran and *Holopogon tibialis* Curran; Dr. W. L. Brown, Jr., Museum of Comparative Zoölogy, not only assisted through Dr. Herman A. Scullen in establishing the identity of *Holopogon phaeonotus* Loew but also kindly lent a male type specimen of *Holopogon seniculus* Loew for the purpose of my designating a lectotype; Dr. F. R. Cole, University of California at Berkeley, has lent a female type specimen of *Holopogon seniculus* Loew, which he had received in an exchange with the late Nathan Banks. Also, paratype specimens of *Holopogon atrifrons* Cole were kindly lent by Dr. Cole.

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SYSTEMATIC DESCRIPTIONS

KEY TO THE *Holopogon* COMPLEX

1. Margin of the scutellum with strong bristles; anal cell narrowly to widely open. *Hadrokolos*, new genus

- Margin of scutellum with hair; anal cell short petiolate.....2
2. Thorax laterally with two to several slender bristles, usually of different lengths, before the transverse suture; hair on the venter not dense
*Holopogon* Loew
- Thorax laterally without bristles before the transverse suture; posteriorly hair on the venter long and dense.....*Dasyholopogon*, new subgenus

HADROKOLOS, NEW GENUS

The genus *Hadrokolos* is erected to receive three species of asilids belonging to the subfamily Dasypogoninae that are related to the genus *Holopogon* Loew. In general, the known species of *Hadrokolos* are more bristly and the hair is more sparse and shorter than is the case with the species of *Holopogon*. The diameter of the femora is greater than the largest diameter of the tibiae, which is generally not true of *Holopogon*, in which the tibiae have the greatest diameter.

In *Hadrokolos* the oral margin has a clump of bristles medially and a few longer bristles laterally, and also bristles are above the clump; dorsally the thorax bears at least posteriorly and sometimes anteriorly strong dorsocentral bristles, also the postalar bristles are strong and long; the scutellum bears two or more strong, long, marginal bristles; the lateral margins of the abdominal tergites have very sparse, short hair; the anal cell is very narrowly to broadly open in the margin of the wing; abdominal segments 7 and 8 both rotate approximately 40 degrees or more from the longitudinal axis of the body so that the two broad, long, ellipsoidal claspers of the male genitalia hang ventrad, with the posterior margins curving anteriorad. In *Holopogon* there is a similar turning of segments 7 and 8, but the claspers are greatly reduced in length.

GENOTYPE: *Holopogon texanus* Bromley.

KEY TO THE SPECIES OF *Hadrokolos*

1. Tibiae and tarsi red (Texas; Oklahoma).....*texanus* (Bromley)
- Tibiae and tarsi black.....2
2. Oral margin with pale bristles; diameter of the hind femora a third greater than that of the hind tibiae (Oklahoma)..*pritchardi*, new species
- Oral margin with strong black bristles; diameter of the hind tibiae subequal to the diameter of the femora (southwestern Texas).....
*cazieri*, new species

Hadrokolos cazieri, new species

FEMALE: Length, 7 mm. Head black, face gray tomentose, vertex laterally gray pollinose, around the base of the ocellar tubercle brownish pollinose, occiput thinly gray pollinose; medially on the oral mar-

gin a dense clump of black bristles, several longer black bristles laterally, on the face two rows of long white bristles, five in each row, extending almost to the base of the antennae, along the margins of the vertex and the upper margin of the occiput a row of weak, short, black bristles, ocellar tubercle and antennae with black bristles.

Thorax black, gray tomentose, median brown tomentose stripe and a lateral spot on each side widely separated; weak, sparse, short bristles covering the thoracic dorsum, longer pale bristles on the anterior calli; scutellum gray pollinose on the flattened area of the disc and brown on the rounded portion, 10 long, strong bristles and a dozen weaker bristles on the rounded portion of the disc; pleurae brownish gray tomentose, with sparse, pale hair.

Abdomen blue-black, tergite 1 laterally, narrowly, gray pollinose, dorsally tergites 1-5 with a narrow band of brown pollen along the anterior margin, tergite 6 with a narrow band of brown pollen at one-third of the width of the segment from the anterior margin, vestiture sparse and pale.

Legs: Diameter of the hind femora about 1.2 times greater than the diameter of the hind tibiae; short, dense hair on the hind tibiae yellow.

Wings light brown, anal cell wide open.

MALE: Face shining yellowish white, vertex yellowish brown tomentose-pollinose, occiput densely gray tomentose below, brown above; medially the oral margin with a clump of black bristles beneath a row of pale bristles; otherwise similar to the female.

Thorax similar to that of the female but more extensively brown tomentose; scutellum brown tomentose, light brown on the flattened area of the disc, posterior margin of the mesothorax above the scutellum gray.

Abdomen similar to that of the female, except for the pollinose band on the anterior margin of tergite 6.

TYPE MATERIAL: Holotype, female, Chisos Basin, Big Bend National Park, Texas, June 14, 1948 (D. Rockefeller expedition, Cazier). Allotype, male, Chisos Mountain, Big Bend Park, Texas (J. Bequaert). Paratype, female, Chisos Mountains, Texas, July 17, 1946 (D. J. and J. N. Knull). Holotype deposited in the American Museum of Natural History, allotype in the Museum of Comparative Zoölogy, paratype in the United States National Museum.

***Hadrokolos pritchardi*, new species**

MALE: Length, 5.5 mm. Head black, the face gray tomentose, the vertex gray tomentose to pollinose, with a brown area below and on

each side of the ocellar tubercle, a shining black spot just above the antennae, the occiput brown and gray pollinose, with more gray near the eye margins and below; the oral margin medially with a clump of yellowish white, strong bristles, laterally and above the clump sparse, longer, pale bristles, orbital bristles pale, weak, short, occipital bristles pale, weak, sparse, hair-like.

Thorax black, gray tomentose, median and lateral brown tomentose stripes with the margins not very distinct; six long, strong, dorso-central bristles, three on each side, bristles on the posterior calli long and strong, black; pleurae gray tomentose; scutellum gray tomentose, margin mixed gray and brown, five strong, long bristles, the bristles on the margin weaker, mostly shorter, pale.

Abdomen reddish along the margins of the tergites, dorsally bluish black; on the dorsum pale recumbent hair; lateral margins of the tergites shining, without long hair; genitalia of the male with broad, concave claspers in a ventrad position.

Wings hyaline basally, some coloring apically, the anal cell narrowly open.

Legs: The diameter of the hind femora about 1.3 times greater than the greatest diameter of the hind tibiae; the hind femora dorsally with five strong, short, recumbent bristles; the tibiae ventrally with four strong, pale, long bristles, anteriorly one bristle, ventrally three weaker, pale bristles; vestiture of the legs pale except for the black spines on the tarsi.

FEMALE: Unknown.

TYPE MATERIAL: Holotype, male, Kenton, Oklahoma, July 6, 1933 (A. E. Pritchard). Holotype deposited in the collection of Dr. A. E. Pritchard at the University of California at Berkeley.

Hadrokolos texanus (Bromley)

Figure 3

Holopogon texanus BROMLEY, 1934, Ann. Ent. Soc. Amer., vol. 27, pp. 89-90.

Bromley restricted his description of *texanus* to color. In addition these characters should be mentioned: The oral margin bears medially a sparse tuft of white bristles with long, white bristles on each side of the tuft and also pale bristles above the tuft and on the face. The thorax bears two rows of long, black, dorsocentral bristles about as strong as the scutellar bristles. Abdominal tergite 1 of the male bears laterally on both sides 12 long, strong, black bristles; in the female these bristles are pale and somewhat weaker. In both sexes the ventral margins of all the abdominal segments are polished, and the posterior

margins of tergites 1 and 2 are laterally narrowly pale and white tomentose on the posterior border.

DISTRIBUTION: Oklahoma: Craterville, July 6, 1934 (A. E. Pritchard); a series of over 50 specimens is at hand. Texas: Type locality, Bradley, July 25, 1921 (R. H. Painter). (See Bromley, 1934, for additional records.) Four of Bromley's paratypes are at hand.

GENUS *HOLOPOGON* LOEW

Holopogon Loew, 1847, Ueber die europäischen Raubfliegen (Diptera Asilica), Linnaea Entom., vol. 2, p. 473. (Genotypic species: *Dasygogon nigripennis* Meigen, 1820, Systematische Beschreibung der bekannten Europäischen zweiflügeligen Insecten, vol. 1, p. 278.) SCHINER, 1862, Fauna Austriaca, vol. 1, p. 129. BACK, 1909, Trans. Amer. Ent. Soc., vol. 35, pp. 311-312. ENGEL, 1938, Asilidae, in Lindner, Die Fliegen der Palaearktischen Region, vol. 4, no. 2, art. 24, pp. 374-375.

The species in this genus show considerable differences in the length and the denseness of the hair, the tomentose and pollinose patterns on the body, the coloration and shape of the wings, and the shape of the hind tibiae, but with many other characters the resemblance is so close as to make identification difficult. These are some of the most distinct characters of the genus itself: The male genitalia have such a close resemblance from one species to another that the writer considers them only as a good generic character. The claspers are broad and short. The diameter of the hind tibiae near the apex is either equal to or greater than the diameter of the hind femora. Also, the metatarsi are swollen. The anal cell of the wings is closed and short petiolate. The hair on the margin of the scutellum varies from weak to strong. On the thorax laterally before the transverse suture are two or more bristles that vary from weak to moderately strong from one species to another. The weak bristles on the oral margin are uniform in spacing.

The European *Holopogon nigripennis* (Meigen), the genotypic species, has tergite 1 laterally gray tomentose and with very sparse, long hair, and the lateral margin of tergite 2 narrowly brown pollinose anteriorly and gray posteriorly. The tomentum of the disc of the scutellum is long medially and much shorter laterally. There is no hair on the disc, but the hairs on the margin are bristle-like.

Holopogon SPECIES COMPLEXES

Because the genitalia of *Holopogon* are of no specific value, the task of separating species in the genus is complex. Some characters that

are available are easy to use and to describe, while others are difficult. When the character is either present or absent the identification is simplified. However, other available characters are more relative and variable. Examples are the length and density of the hair and also the pollinose or tomentose patterns on the thorax and on the abdomen. For these reasons some of the species complexes present in *Holopogon* of the United States are difficult to clarify. Whether these complexes represent more than one species, two or more subspecies, or simply species with great variability could not be determined for the present studies.

Seniculus COMPLEX: The tomentum on the scutellum varies from totally brown to totally gray, brown being the most common color. The posterior sloping area of the disc ranges from densely tomentose in most specimens, to very thinly tomentose in a few, to completely polished in others. The wing veins vary from yellow to dark brown.

Acropennis COMPLEX: There is a wide variation in the tomentose patterns on the thorax.

Phaeonotus-Oriens COMPLEX: The two species can be separated, but the general coloration, vestiture, and the lateral pollinose patterns on the abdomen are very similar. Within each species are a number of variations, particularly in the color pattern of the thorax.

Guttula COMPLEX: The species falls into two distinct groups on the basis of the pollinose patterns on the abdomen and the color of the face. Apparently these are merely variations with the species.

THE TERMS "TOMENTUM" AND "POLLEN"

In general, tomentum is a patch of fine, microscopic, short hairs covering the body in small to large areas. Under high magnification the tomentum resembles the pile of velvet. The length, fineness, and density vary on the same individual and determine how easily the tomentum can be seen. Tomentum may be partially invisible, because the diameters of the hair are so microscopic that the eye cannot resolve them. Also, much light is reflected through the fine, sparse tomentum, so that it cannot be seen except in profile.

The tomentum on the vertex is usually sparse and dark colored on many species. When viewed from above, the tomentum is invisible, but when viewed from an angle so as to be in profile it may seem very abundant.

The tomentose patterns on the thorax are of some taxonomic value. Also they are sex-linked. In this region the tomentum may be invisible at some angles.

Pollinose patterns of diagnostic value are found on the lateral margins of the abdominal tergites and in some species on the dorsum. The tergites of *Holopogon atrifrons* Cole and *currani*, new species, are broadly covered with velvety brown pile. From many angles the tomentum appears only as purplish reflections until viewed in profile.

The term "pollen" refers to the dust-like granules found on the surface of the body and forms the same patterns as the tomentum. Sometimes high magnification is needed to determine whether pollen or tomentum is present.

KEY TO THE *Holopogon* OF NORTH AMERICA

1. Scutellum with two strong marginal bristles; abdominal segments 1-5 with small, triangular, yellowish gray spots on the hind angles; legs rather slender, black (Guerrero, Mexico) .. *dejectus* Williston
Scutellum with hair on the margin, disc with or without hair 2
- 2(1). Legs black 5
Either all legs with red tibiae or the anterior four only 3
- 3(2). All the tibiae red; the wings hyaline (Kansas, Oklahoma, Texas) *snowi* Back
Only the tibiae of the anterior four legs red; the wings brownish, darker distally 4
- 4(3). Abdomen yellow, medially each segment with a large triangular black spot, the apex nearly reaching the posterior margin; pleurae gray pollinose (Guerrero, Mexico) *pulcher* Williston
Abdomen black, with brilliant violaceous reflections, all segments with triangular yellowish gray pollinose spots on each hind angle; pleurae gray, with a shining vertical spot in the middle (Guerrero, Mexico) *violaceus* Williston
- 5(2). Disc of scutellum with a few to many hairs 7
Margin of scutellum with hair, disc without hair or, if with a few hairs, wings deep brown 6
- 6(5). Hair on the margin of the scutellum long, the wings a deep brown (Colorado, New Mexico, Arizona) *atripennis* Back
Scutellum with weak marginal hairs shorter than the stronger posterior hairs on the thorax; face of male subshining black, of female pale tomentose; wings hyaline (Arizona, Nevada, New Mexico) *currani*, new species
- 7(5). Face pale tomentose, with a small to large median brown spot (male; Pacific coast) *stellatus*, new species
Face without a median spot 8
- 8(7). Face and vertex subshining black, with dark pollen almost invisible (male; California) *atrifrons* Cole
Face covered with visible tomentum 9
- 9(8). Disc of scutellum polished on the posterior margin (Arizona, New Mexico) *wilcoxi*, new species
Disc of scutellum totally tomentose 10
- 10(9). Wings with yellow veins, microtrichia of wing white; vestiture white,

- long, rather dense (Nebraska, Colorado, Wyoming, South Dakota, Montana, Alberta, Saskatchewan) *seniculus* Loew
 Wings with brown veins, at most yellow basally; microtrichia brown; vestiture usually both pale and dark 11
- 11(10). Abdominal tergite 1 laterally thinly pollinose, or densely brown pollinose, tergites 2-3 and sometimes 4 narrowly brown pollinose, or tergites 3-4 shining 13
 Abdominal tergite 1 laterally densely gray pollinose and at least tergites 2-4 pollinose laterally 12
- 12(11). Abdominal tergites 3-4 laterally with anterior corners polished and posterior corners gray pollinose, dorsally tergites 2-6 with broad, brown pollinose bands (female; California) *atrifrons* Cole
 Abdominal tergites 2-4 laterally either rather broadly gray (female), or brown (male) pollinose; scutellum anteriorly usually gray pollinose (occasionally bright pale brown in the males) and dark brown posteriorly (Georgia, Florida, South Carolina, New Jersey, Texas) *guttula* (Wiedemann)
- 13(11). Thorax anteriorly with a dark, either broad or narrow, median stripe, with sharp or diffuse margins outlined by pale tomentum 16
 Thorax anteriorly either without a distinct median stripe or the stripe dark brown pollinose or tomentose and nearly of the same color as the tomentum nearest it; little or no pale tomentum on the dorsum 14
- 14(13). Thorax medially shining with a brown tomentose, usually geminate, median stripe (male; Ontario, Quebec, Manitoba, Illinois, Michigan, Wisconsin, New York, Connecticut, Georgia).....
 *vockerothi*, new species
 Median stripe on the thorax indistinct or not present 15
- 15(14). Disc of scutellum densely reddish brown tomentose; dorsum of thorax with mostly pale tomentum (British Columbia to western Manitoba, southward to Oregon, Utah, Wyoming) .. *albipilosus* Curran
 Disc of scutellum shining, very thinly pollinose; dorsum of the thorax mostly dark brown tomentose (Pacific coast) .. *stellatus*, new species
- 16(13). Diameter of apical three-fifths of the hind tibiae uniform in diameter or slightly tapering at most, and about equal to the diameter of the hind femora (North Carolina, Tennessee, New York, Minnesota, Ohio, South Carolina) *oriens*, new species
 Hind tibiae club-shaped, greatest diameter near apex, diameter of hind femora less than that of the tibiae 17
- 17(16). Scutellar discal hair at least posteriorly about equal to length of marginal hair 19
 Scutellar marginal hair longer than hair on disc..... 18
- 18(17). Hair on dorsum of thorax short, erect, sparse (female; Arizona)
 *mingusae*, new species
 Hair on dorsum of thorax long, reclinate, at least in part, rather dense (female; see couplet 15).....*albipilosus* Curran
- 19(17). Hind tibiae, in profile from anterior side, dorsally with several long, suberect bristles and a small number of much shorter, sparse, hair-like bristles; length 7 mm. or less (southwestern United States).. 21

- Hind tibiae, in profile from anterior side, dorsally with several strong bristles as long as or longer than numerous hair-like bristles; length 8 mm. (eastern North America) 20
- 20(19). Wings narrow, light brown (eastern United States and Canada).....
*phaeonotus* Loew
- Wings broad, hyaline (Ontario to Florida)....*vockerothi*, new species
- 21(19). Wings hyaline, apex rather broadly rounded; long hair at base of costal vein white or yellowish white (male; Arizona).....
*mingusae*, new species
- Wings brownish, apex more or less pointed, long hair at base of costal vein mostly brown (New Mexico; Arizona).....
*acropennis*, new species

Holopogon albipilosus Curran

Figures 1, 10

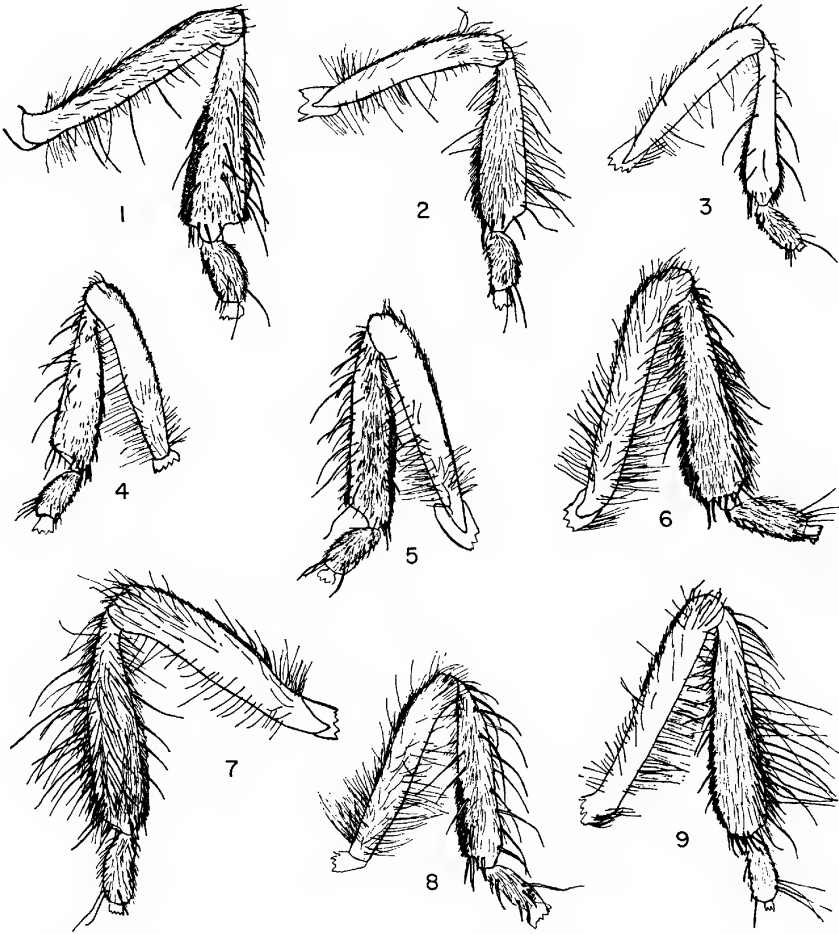
Holopogon albipilosus CURRAN, 1923, Canadian Ent., vol. 55, p. 207.

The males of *albipilosus* and *stellatus*, new species, have been labeled in collections as being the same species. The latter has a brown spot on the face. The males of *albipilosus* and *caesariatus*, new species, were collected together in Idaho and have a close resemblance. The former species possesses spines laterally before the transverse suture that the latter does not have.

Usually the density and color of the tomentum on the vertex are a reliable character for the separation of the females of *albipilosus* and those of *stellatus*. The tomentum on *albipilosus*, when observed from above, is dense and usually pale in color. Occasionally the pale tomentum is confined to near the margins of the eyes, while the tomentum around the tubercle is brown. From the same view the vertex of *stellatus* is thinly and usually dark tomentose. On many specimens of *stellatus* the tomentum does not become visible until viewed directly at the bases of the antennae. With few exceptions there is an elongate reddish cinnamon brown area which varies in size from a small spot to an area covering the entire front and vertex. Wherever present, the brownish area on the front and vertex of *albipilosus* is a deeper color and is not reddish.

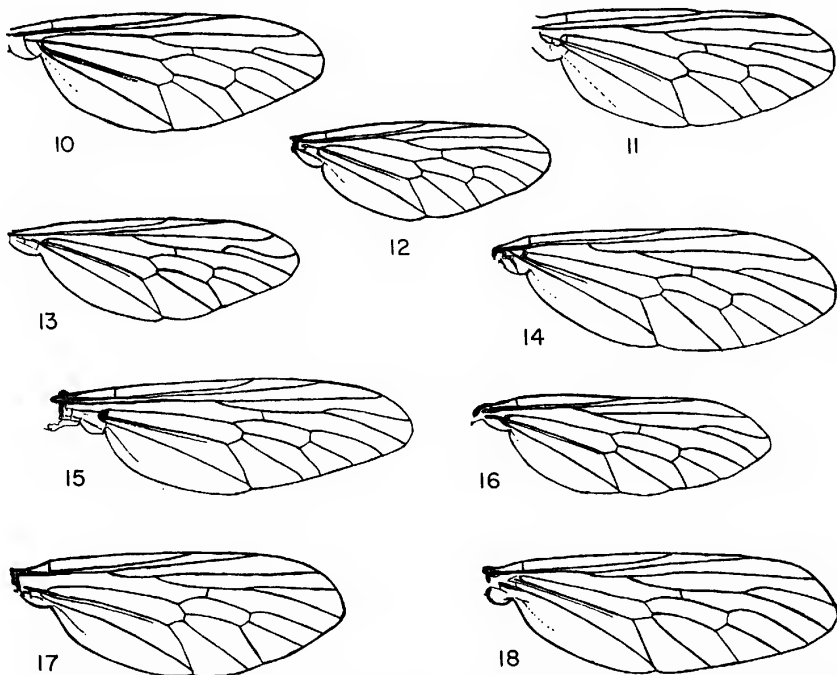
Most of the 200 specimens of *albipilosus* at hand have rather long, suberect to reclinate, crinkly white hair on the dorsum of the thorax. The male holotype of *albipilosus* has white hair on the thorax, with a median spot of reddish brown hair. This spot is not found on most specimens.

The hair along the lateral margins of the abdominal tergites is generally white on most specimens, being more variable in the male than in the female. The longer hair on tergites 1-3 of the male is almost



FIGS. 1-9. Hind femur and tibia. 1. *Holopogon albipilosus* Curran, female paratype. 2. *Holopogon stellatus*, new species, male, holotype. 3. *Hadrokolos texanus* (Bromley), female. 4. *Holopogon mingusae*, new species, male paratype. 5. *Holopogon acropennis*, new species, male paratype. 6. *Holopogon vockerothi*, new species, male paratype. 7. *Holopogon oriens*, new species, male paratype. 8. *Holopogon seniculus* Loew, male. 9. *Holopogon phaeonotus* Loew, male topotype.

always mostly white, but the shorter hair on tergites 4-6 varies from white to yellowish white, to yellowish brown, to dark brown. According to Vockeroth, the short hairs on abdominal tergites 4-6 of the holotype are yellow brown, darkening posteriorly until they are dark brown on segment 6.



FIGS. 10-18. Tracings of the wing. 10. *Holopogon albipilosus* Curran, male. 11. *Holopogon mingusae*, new species, male paratype. 12. *Holopogon stellularis*, new species, male paratype. 13. *Holopogon acropennis*, new species, male paratype. 14. *Holopogon oriens*, new species, female paratype. 15. *Holopogon phaeonotus* Loew, male. 16. *Holopogon guttula* (Wiedemann), female. 17. *Holopogon oriens*, new species, male paratype. 18. *Holopogon phaeonotus* Loew, female.

The lateral margin of abdominal tergite 1 of the female is gray pollinose, with a mixture of brown, while tergite 2 is narrowly brown pollinose, with a gray cast. This pollen does not seem to be present in the male, although the lateral hair is so thick that only very distinct pollen could be seen.

DISTRIBUTION: *Alberta*: Drumheller, June 14-16, 1946 (E. H. Strickland); Lethbridge, July 5 (J. H. Pepper); Medicine Hat, June 24, 1932 (F. S. Carr); Morrin, June 27, 1939 (P. J. G. Rook); Wainwright, June 24, 1938 (E. S. Strickland). *British Columbia*: Paratype, Chilcotin, July 17, 1920 (E. R. Bucknell); Robson, August 4, 1950 (H. R. Foxlee); Vernon, July 26, 28, 1938 (Hugh Leech). *Idaho*: Athol, Kootenai County, July 11, 1954 (W. F. Barr); Cub River Canyon, southern Idaho, July 11, 1953 (Knowlton, Hanson, Cross); Montpelier, 6100 feet, July 6, 1920;

Spencer, July 14, 1934 (Dorothy W. Martin, Charles H. Martin); Targhee National Forest, near Spencer, July 17, 1934 (Dorothy W. Martin, Charles H. Martin). *Manitoba*: Deloraine, July 2, 1927 (E. and S. Criddle); Glen Souris, July 7, 1925 (R. M. White). *Minnesota*: Anoka, June 23, 1936 (A. E. Pritchard). *Montana*: Bridger Mountains, 5500 feet, August 10, 1915; Chateau, July 23, 1946 (G. F. Knowlton); Dillion, July 16, 1934 (Charles H. Martin); Gallatin Valley, July 9, 1903; LoLo, July 1, 1904; Lombard, 4000 feet, June 26, 1902; Three Forks, July 12, 1912. *Nevada*: Conover Pass, White Pine County, June 23, 1950 (C. D. Michener). *North Dakota*: Beach, June 19, 1923. *Oregon*: Crook County, 10 miles southwest of Prineville, Crooked River, July 22, 1939 (Gray and Schuh); Grant County, Antelope Mountain, 6500 feet, July 6, 1931 (D. K. Frewing); Harney County, Otis Valley, near Drewsey, 4000 feet, August 5, 1932 (D. K. Frewing); Lake County, Bull Prairie, Camas Prairie Summit, 7500 feet, July 23-26, 1932 (D. K. Frewing); Hart Mountain, July 31, 1932 (D. K. Frewing). *Saskatchewan*: Attons Lake, Cut Knife, June 12, 1940 (A. R. Brooks); Pike Lake, June 13, 1948 (J. R. Vockeroth); Rache Perces, July 4-8, 1927 (E. and S. Criddle); Rockglen, latitude 49° 11' N., longitude 105° 56' W., June 25, 1955 (J. R. Vockeroth); Saskatoon, June 11, 1948 (J. R. Vockeroth). *Utah*: Circleville, June 6, 1952 (G. F. Knowlton); Davis, June 26, 1943 (G. F. Knowlton); Johnson's Reservoir near Fish Lake, July 14, 1948 (Jean Duspiva); Laketon, July 19, 1939 (G. F. Knowlton). *Washington*: Tieton, August 15, 1933 (J. Wilcox; S. E. Crumb). *Wyoming*: Albany County, Easterbrook, 6500 feet, June 23, 1948 (F. Werner and W. Nutting); Carbon County, Long Tree, July 15, 1950 (G. F. Knowlton); Green River, 6100 feet, July 2, 1920; Jackson, 6300 feet, July 13, 17, 1920; July 22, 1953 (R. R. Dreisbach); Landers, July 22, 1953 (R. R. Dreisbach); Torrey's Lake, September 7, 1895 9 (William Wheeler collection).

***Holopogon acropennis*, new species**

Figures 5, 13

Holopogon acropennis is a southwestern species that is closely related to a second species in the same area, *Holopogon mingusae*, new species. The two species can be separated by the wings, those of *acropennis* being shorter, more pointed, and with a distinct brownish tinge, while the wings of *mingusae* are longer, more broadly rounded apically, and hyaline.

MALE: Length, 7 mm. Head black, face light brownish yellow tomentose, narrowly gray tomentose along the eyes, tomentum on front and

the vertex darker than on the face, a reddish brown tomentose spot below the ocellar tubercle; vestiture black except the white hair around the proboscis.

Thorax black, laterad of the median dark brown tomentose stripe a brownish yellow tomentose area extending to the callus and around to the transverse suture; hair fairly long and dense, blackish brown except anteriorly a few yellowish and also white hairs; scutellum brownish tomentose, with fairly sparse, long, crinkly, brownish black hair.

Abdomen shining blue-black; tergite 1 laterally gray pollinose, tergite 2 laterally narrowly brown pollinose, hair on tergites 1-2 laterally of equal length, pale on tergite 1, mixed pale and dark on tergite 2, becoming shorter on tergites 3-4, tergites 3-7 with dark hair, tergite 3 posteriorly and tergites 4-7 with hair at a 45-degree angle, giving the lateral margin of the abdomen a brush-like appearance, dorsally the hair raised at the same angle and longer on most specimens.

Wings hyaline; sparse microtrichia becoming more numerous in the middle of the apical cells, forming narrow, longitudinal stripes.

Legs black, the four anterior tibiae with white hair except antero-dorsally a row of black, weak bristles and apically black bristles; hind femora with brown to brownish white hair, dorsally recumbent brown hair, diameter apically about two and one-half times the diameter basally, with black bristles and hair, ventral and posterior surface with yellow, short, dense hair.

FEMALE: Similar to male; thorax with extensive gray tomentose areas laterad to the median, brown tomentose stripe; abdominal tergite 1 laterally thinly gray pollinose, tergite 2 more narrowly mixed brown and gray pollinose; along the lateral margin of the abdomen the white hair of nearly uniform length.

TYPE MATERIAL: Holotype, male, Ruidioso, Boy Scout Camp, New Mexico, June 20, 1956 (Charles H. Martin). Allotype, female, same data (Dorothy W. Martin). Paratypes: *New Mexico*: Same data as allotype, one male, one female; Cloudcroft, June 27, 1940 (L. J. Liposky), one female; Jemez Springs, 8 miles north, July 23, 1950 (Charles H. Martin, one male, July 1, 1941 (Burt Hodges), one male, (E. L. Todd), one female; Calaveras Camp, Highway 126, August 3, 1948 (Charles H. Martin), three males; Grant County, June 14, 1933 (R. T. Kellogg), one female; White Mountains, Rio Ruidioso, 6500 feet, July 21 (Townsend), one female. *Arizona*: McMillan, June 27, 1949 (Charles H. Martin), one female; White Mountains, June 19, 1950 (R. H. Beamer), one female. *Colorado*: Beulah, 7000 feet, August 8 (R. H. Painter),

one female. Holotype and allotype deposited in the collection of the American Museum of Natural History. Paratypes are in the collections of the United States National Museum, University of Kansas, J. Wilcox, and the writer.

REMARKS: The anterior median stripe is not present on the three male specimens from Calaveras Camp, New Mexico. However, the vestiture pattern and the shape and coloring of the wings are as in the holotype. I believe that the presence or absence of the median tomentose stripe on the thorax is probably a variation in this species.

Holopogon atrifrons Cole

Holopogon atrifrons COLE, 1924, Pan-Pacific Ent., vol. 1, p. 8.

The narrow, subshining black, very sparsely blackish brown tomentose face is characteristic of both *Holopogon atrifrons* and *currani*, new species. A close relationship between the two species is also indicated by the fact that the abdominal tergites are covered with short, brown tomentum. In *atrifrons* the tomentum covers the tergites completely but is thin laterally so that it appears and disappears along the lateral margin, depending on the angle of view; tergite 1 is polished medially. In *currani* the lateral margins, the posterior margins, and the whole dorsum of abdominal tergites 1 and 2 are polished.

There is similar but more distinct tomentum on the tergites of two European species. The male of *Holopogon venustus* Rossi has the last three tergites covered with dense, yellowish gray tomentum except on the very narrow lateral and posterior margins; anteriorly there is a patch on tergite 3. The last and the next to last tergites of *H. melas* L. Dufour are tomentose. In other respects the North American and European species differ.

The female of *atrifrons* can be separated from those of all other species by the fact that the abdominal tergites are covered dorsally with brown tomentum that changes to gray laterally. The anterior corners of tergites 3–5 are polished. The face of the female is gray tomentose and the front brownish tomentose. The female of *currani* has polished tergites.

DISTRIBUTION: I have at hand three paratypes, Mill Creek Canyon, California, August 16, 1920 (F. R. Cole), one male, two females. Topotypes: Sixty males and females, San Bernardino Mountains, South Fork, California, August 2, 1949 (Dorothy W. Martin, Charles H. Martin). These specimens were collected within a few miles of Mill Creek Canyon, where Cole collected the type specimens. In this series are two pairs collected while mating. *California*: Eldorado County: Strawberry

Valley, August 9, 1912 (E. C. Van Dyke). Fresno County: Paradise Valley, Kings River, 7000 feet, July 17, 1910 (E. C. Van Dyke); South Fork, Kings River Canyon, 5000 feet, July 4, 1910 (E. C. Van Dyke). Los Angeles County: Los Angeles, July 20, 1936 (A. E. Pritchard); Wrightwood, July 20, 1954 (Charles H. Martin); Camp Baldy, July 11, 1950 (J. W. MacSwain). Riverside County: Riverside, July 27, 1936 (A. E. Pritchard). San Bernardino County: Hanna Flats, Big Bear Lake, July 31, 1949 (Charles H. Martin); Miller Canyon, San Bernardino Mountains, August 29, 1941 (W. F. Barr). San Diego County: Mt. Palomar, August 24, 1949 (Dorothy W. Martin, Charles H. Martin). Shasta County: Viola, Highway 44, August 28, 1948 (Charles H. Martin).

Holopogon atripennis Back

Holopogon atripennis BACK, 1909, Trans. Amer. Ent. Soc., vol. 35, p. 312.

Back's name *atripennis* (black wing) is very appropriate for this species. The wing is densely dark brown, with the tip somewhat paler. In most of the specimens at hand the disc of the scutellum is polished, and there are long, weak, sparse hairs on the margin. In two specimens there is a narrow line of brown tomentum across the anterior margin. The lateral margin of abdominal tergite 1 is thinly brownish gray pollinose in well-marked specimens, but in others there is frequently only a trace of pollen. The lateral margin of tergite 2 of the female is very narrowly brown pollinose on the anterior third, while in the male the narrow band extends along the entire margin. There are a number of specimens at hand with the margins of tergites 1 and 2 without pollen. Both the lateral margins of the remaining tergites and the dorsum of all the segments are shining.

DISTRIBUTION: *Arizona*: Chiricahua Mountains, June (D. K. Duncan), June 22, 1956 (Charles H. Martin), July 3, 1947 (R. H. Beamer); Flagstaff, July 14, 1947 (L. D. Beamer); Huachuca Mountains, June (D. K. Duncan); Rustlers' Park, Chiricahua Mountains, June 17, 1956 (R. and K. Dreisbach). *Colorado*: Fort Collins, July 5, 1938 (M. T. James); La Veta Pass, July 26, 1946 (Charles H. Martin); Pinecliffe, July 9, 1949 (J. R. White); Boulder, June 19, 1933 (M. T. James); Westcliffe, June 10, 1926 (E. G. Anderson); Virginia Dale, July 27, 1953 (R. R. Dreisbach). *New Mexico*: Type locality, Highrolls and Cloudcroft; Calaveras Camp, Highway 126, August 3, 1948 (Charles H. Martin); Cimarron Canyon, Colfax County, June 12, 1956 (R. and K. Dreisbach); Jemez Springs, July 1, 1941 (R. H. Beamer, E. L. Todd); Moriarity, June 23,

1941 (L. R. Banker); Sandia Mountains, July 17, 1952 (R. H. and L. D. Beamer and others); Taos, June 24, 1949 (D. G. Denning).

Holopogon currani, new species

The scutellum of *Holopogon currani* is similar to that of *wilcoxi*, new species, in being pollinose anteriorly and polished posteriorly. In *currani* the apex of the triangle of pollen may almost reach the posterior margin. Also, the pale hairs are confined to the margin of the scutellum and are more sparse and weaker than in *wilcoxi*. The male is also similar to that of *atrifrons* Cole in having a subshining face, front, and vertex. In addition, abdominal tergites 4-7 dorsally have broad tomentose bands while tergites 2-7 of *atrifrons* are very broadly tomentose.

MALE: Length, 6 mm. Head subshining black, thinly brown pollinose, vestiture brownish black; face narrower than in most species.

Thorax black, thinly brown pollinose except for a more densely gray pollinose area between the anterior calli and the transverse suture, also more densely reddish brown pollinose anteriorly between the calli; vestiture sparse, short, pale anteriorly, longer and blackish brown posteriorly; scutellum thinly brown pollinose on the anterior flattened area, with a triangular wedge extending about halfway to the posterior margin, rounded posterior margin shining, a few weak, short, black hairs on the margin; pleurae thinly mixed gray and brown pollinose, a few pale hairs before the wing base.

Abdomen more narrow than in most species, blue-black; laterally tergite 1 brown pollinose, tergite 2 very narrowly pollinose, the remaining segments narrowly shining; dorsally tergites 3-7 brown pollinose, tergite 3 with a very thin, medial patch, tergite 4 with anterior and posterior margins narrowly polished, tergite 5 with posterior margin polished, tergite 6 with the posterior margin more broadly polished, tergite 7 broadly polished posteriorly; laterally tergites 1 and 2 with sparse, pale, long hair, remaining tergites either with shorter hair or no hair.

Wings hyaline.

Legs: Diameter of apex of the hind tibiae much greater than that of the hind femora, bristles on hind tibiae black, not so abundant as on many species, short, dense, hair brown anteriorly, posteriorly, and ventrally.

FEMALE: Face and front grayish tomentose with a yellowish hue, front more thinly tomentose; thorax anteriorly with more extensive, pale, denser tomentose areas than on male; laterally tergite 1 mixed

gray and brown pollinose, tergite 2 with light brown pollinosity confined anteriorly along the margin; dorsum of abdomen polished black; vestiture more sparse than in male; hind tibiae more slender than in male, short, dense hair yellow to reddish brown anteriorly, yellow ventrally, yellow to some reddish brown hairs posteriorly.

TYPE MATERIAL: Holotype, male, Winona, Arizona, July 21, 1949 (Dorothy W. Martin). Allotype, female, same data as holotype. Paratypes: Same data as holotype (Dorothy W. Martin, Charles H. Martin), 36 males and females. *Arizona:* Carrizo, June 29, 1949 (Dorothy W. Martin, Charles H. Martin), six females, two males, August 12, 1948 (J. Wilcox), six females, two males; Chiricahua Mountains, June 20, 1956 (Charles H. Martin), two males, one female; Coconino County, August 13, 1927 (R. H. Beamer), one female; Huachuca Mountains, Miller Canyon, June 26, 1949 (J. Wilcox), six females, two males; MacMillan, June 27, 1949 (Charles H. Martin), one female; McNary, August 9, 1948 (Dorothy W. Martin), one female; Mingus Mountain, July 3, 1949 (Dorothy W. Martin, Charles H. Martin), three males, three females; Oak Creek Canyon, Sedona Bridge, July 2, 1949 (Charles H. Martin), two males, one female; Oak Creek Canyon, June 28, 1950 (Lucy D. Beamer), one male, July 9, 1941 (E. L. Todd), one female; Pima County, Tucson, June 4, 1952 (M. Cazier and others), one female; Sedona, June 21–23, 1949 (Dorothy W. Martin, Charles H. Martin), nine females, three males, July 2, 1949 (J. Wilcox), two males, one female; Showlow, Navajo Reservation, August 9, 1948 (Dorothy W. Martin), one female; Santa Rita Mountains, June 23, 1949 (Dorothy W. Martin, Charles H. Martin), four females, one male. *Nevada:* Oak Springs, Nye County, May 26, 1940 (W. Reeves and others), two males. *New Mexico:* Cloudcroft, June 27, 1940 (E. E. Kenoga), one female; Sandia, July 7, 1953 (R. H. and L. D. Beamer and others), one female; Silver City, June 6, 1935 (R. T. Kellogg), six females, one male. Holotype and allotype deposited in the American Museum of Natural History. Paratypes are in the collections of the United States National Museum, Cornell University, University of Kansas, R. R. Dreisbach, J. Wilcox, and the writer.

REMARKS: The female is more variable than the male. The color of the mystax ranges from totally black to mixed black and white, to totally white. The pollen anteriorly on the mesothorax ranges from the usual pale yellowish white to reddish brown. The lateral pollinosity on tergite 2 ranges from white to brown.

The specimens collected several miles east of Winona, Arizona (the

type series), were perching on dead juniper twigs. Two mating pairs were collected.

Holopogon guttula (Wiedemann)

Figures 16, 19, 20

Dasygogon guttula WIEDEMANN, 1821, Diptères exotiques, p. 228.

Dasygogon guttula WIEDEMANN, 1828, Aussereuropäische zweiflügelige Insekten, vol. 1, p. 411.

Dasygogon guttula?, WALKER, 1849, List of dipterous insects in the collection of the British Museum, pt. 2, p. 355.

Holopogon philadelphicus SCHINER, 1867, Verhandl. Zool-Bot. Gesellsch. Wien, vol. 17, p. 360.

Holopogon philadelphicus, LOEW, 1874, Berliner Ent. Zeitschr., vol. 18, p. 367.

Holopogon guttula, JOHNSON, 1905, Psyche, vol. 12, p. 78 (*Holopogon philadelphicus* Schiner a synonym of *guttula*).

Holopogon guttula, BACK, 1909, Trans. Amer. Ent. Soc., vol. 35, p. 313.

In order to establish the true identity of *Holopogon guttula* (Wiedemann) the writer sent to Dr. S. L. Tuxen a half dozen female specimens representing three species from the states near Georgia, the type locality, for comparison with the female type specimen on which the original description is based. Dr. Tuxen's reply to the questions on the diagnostic characters establishes the fact that the female of *guttula* has the lateral margins of abdominal tergites 1-3 marked with broad, gray, densely pollinose markings, tergites 4 and 5 are more narrowly gray pollinose, and tergite 6 is narrowly brown pollinose. This striking pollinose pattern distinguishes the female of *guttula* from that of all other species of *Holopogon*, including the strikingly marked female of *atrifrons* Cole, a species from California. The species ranges along the Atlantic coastal states from New Jersey to Florida, and a series is at hand from Texas. Collecting records indicate that *guttula* is primarily a spring species.

The male of *guttula* differs from other males of *Holopogon* in having the lateral margin of abdominal tergite 1 densely gray pollinose, and the remaining tergites with the lateral margins more broadly brown pollinose than those of the males of *Holopogon phaeonotus* Loew.

On the basis of the description, *Holopogon guttula* (Wiedemann) could never be recognized because the broadly pollinose lateral margins of the abdominal tergites of the female are not mentioned by Wiedemann. As a result the exact identity of *guttula* could not have

been known to past students of the Asilidae on the basis of the description alone.

VARIABILITY OF *guttula*

The face and vertex of both sexes in a series grade from bright tan to mixed brown and gray, to gray. Specimens with a gray face and vertex predominate in the east, while the tan face and vertex predominate in the Texas series. The length of the style of the antennae is variable, but generally in the males it is subequal to the third segment. The style of the females tends to be somewhat shorter than that of the males.

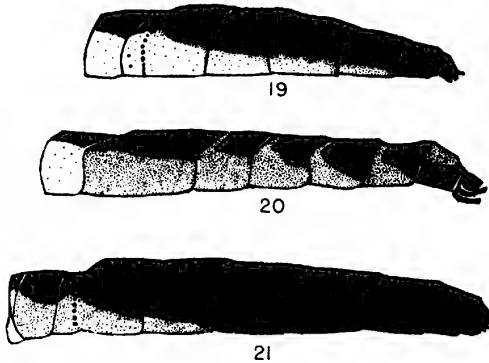
The scutellar hair is sparse and long. In both sexes there is a tendency for the hairs on the margin of the scutellum to be slightly stronger than the hairs on the disc. Usually the scutellum of both sexes is brown tomentose, with a large gray tomentose spot on the anterior margin that extends over the posterior margin of the mesonotum. However, there are a few males from Texas with the gray replaced by bright, light brown tomentum.

The lateral pollinose marginal markings on the abdominal tergites of the females show considerable variation in shape and width. Some specimens have the markings expanded anteriorly on some tergites and either abruptly or gradually becoming narrower posteriorly on the tergite. In others the markings are much broader and more uniform in width. On some specimens the pollen is more brownish than gray. Apparently these differences are not specific or subspecific.

In the males there are also noticeable differences in the width of the markings on the lateral margins of the tergites. Also, as in *phaeonotus*, the lateral pollinose markings may extend upward and across the anterior margins of the tergites. There is considerable variability in the presence or absence of the transverse stripes; one specimen had stripes on tergites 3–6, nine had stripes on tergites 4–6, and 10 had stripes on tergites 5 and 6.

LECTOTYPE: Dr. S. L. Tuxen has written me (June 17, 1958) that there are a male and a female in the type series of *Holopogon* (formerly in *Dasyopogon*) *guttula* (Wiedemann) at the Universitetets Zoologiske Museum at Copenhagen, Denmark. I have requested him to label the female that was collected at Savannah, Georgia as the lectotype of *Holopogon guttula* (Wiedemann).

HOMOTYPES: I have labeled the two specimens compared by Tuxen with the lectotype specimen as homotypes. One specimen collected at Mount Pleasant, Florida, May 1, 1952, by G. S. Walley (female no. 4)



FIGS. 19–21. Pollinose patterns on the lateral margin of the abdomen. 19. *Holopogon guttula* (Wiedemann), female. 20. *Holopogon guttula* (Wiedemann), male. 21. *Holopogon phaeonotus* Loew, female.

is deposited in the Canadian National Collection. A second specimen collected at Aiken, South Carolina, May 30, 1957, by H. F. Howden (female no. 3) is in the collection of the writer.

DISTRIBUTION: *Florida:* Mount Pleasant, May 4, 1952 (O. Peck); Orlando, April 13, 1928; Chattahoochee, April 30, 1952 (G. S. Walley); Jacksonville, April 23 (Mrs. A. T. Slosson); Bratt, April 10, 1933 (Alton Blanton); Palatka, May 3, 4, 1916 (J. C. Bradley); Silver Springs, April 29, 1928. *Georgia:* Savannah, type locality, Augusta, May 4, 1946 (P. W. Fattig). *New Jersey:* Browns Mills, June 12, 1921 (No. F4267K, in the American Museum of Natural History). *North Carolina:* Carolina Beach, May 12, 1936 (F. S. Blanton). *South Carolina:* Aiken, May 31, 1957 (W. J. Brown), May 30, 1957 (H. F. Howden). *Texas:* La Grande, April 10, 1953 (Dorothy W. Martin, Charles H. Martin); Bastrop, May 11, 1954 (Lucy D. Beamer, R. H. Beamer).

***Holopogon mingsuae*, new species**

Figures 4, 11

Holopogon mingsuae is related to *acropennis*, but the hair on the former is more sparse and shorter. Also, the microtrichia on the wings are small and not very visible, while on the wings of *acropennis* the microtrichia are larger, distinctly brown, and are more easily seen.

MALE: Length, 6 mm. Head black, face and front gray tomentose, slightly brownish below the antennae, brown pollinose around the ocellar tubercle; occiput black, very thinly brown pollinose, mystax mixed black and white, except for the blackish brown, bristle-like hair curled over the margins of the eyes.

Thorax shining black, brown tomentose with brownish white areas lateral to the broad, median, brown tomentose stripe, yellowish gray spot before the transverse suture; anteriorly hair sparse, weak, pale, medially mixed pale and brown hair, posteriorly hair slightly longer, brown; scutellum brown tomentose, hair sparse, weak, pale; pleurae mixed gray and brown tomentose.

Abdomen shining blue-black; tergite 1 laterally very thinly brown pollinose, dorsally and laterally anterior margin with two brown, densely pollinose, elongated, narrow spots; tergites 1 and 2 laterally with hair pale, thin, and longer than on tergite 3, remaining segments with short, sparse hair, pale on tergite 4, brown on tergites 5-7, tergite 4-7 dorsally with hair short, recumbent, and brown.

Wings hyaline, long hair on the base of the costal vein white, apex of wing rounded and much broader than the wing of *acropennis*, new species.

Legs: Middle legs with a row of long bristles and apical bristles, black, remaining bristles white; hind femora dorsally with recumbent, yellowish white hair except dark apically; hind tibiae with short, black bristles ventrally, anterodorsally a row of long, black bristles, short, dense hair on the posterior and ventral surfaces yellow.

FEMALE: Similar to the male; thorax with sparse, pale, weak hair to the transverse suture, extensive brownish gray areas outlining the median brown tomentose stripe; abdominal vestiture sparse, shorter than the vestiture of the male; tergite 1 laterally thinly mixed gray and brown pollinose anteriorly, gray posteriorly; legs with more pale bristles than those of the male.

TYPE MATERIAL: Holotype, male, Mingus Mountain, Arizona, July 3, 1949 (Charles H. Martin). Allotype, female, same data. Paratypes: Same data as holotype (Dorothy W. Martin, Charles H. Martin), 12 males, nine females, (J. Wilcox), one male, three females; Pinal Mountains, Arizona, May 13, 1934 (F. H. Parker), one female; Bright Angel, Grand Canyon, Arizona, July 11 (Barber and Schwarz), one female. Holotype and allotype deposited in the American Museum of Natural History. Paratypes in the collections of the United States National Museum, J. Wilcox, and the writer.

Holopogon oriens, new species

Figures 7, 14, 17

Holopogon oriens is very similar to *phaeonotus* Loew in appearance, but the wing of the former is broader apically and hyaline. The dense, short hair on the hind tibiae of the male of *oriens* is yellow to

coppery brown, while this hair is a darker brown on *phaeonotus*. The hair on the base of the costal vein is mostly white to pale brown on *oriens* and a darker brown on *phaeonotus*. There are no pollinose patterns on the dorsum of the abdomen of *oriens*.

MALE: Length, 6 mm. Head black, face with reddish brown tomentum, partially subshining, vertex similar; vestiture black except for the white hair on the lower occiput, length and density of hair on vertex about the same as the mystax; hair on the margin of the occiput extending most of its length over the margin of the eyes; occiput black, dark brown pollinose.

Thorax black, dark brown tomentose, broad, median stripe confluent with the lateral stripes, outlined by light yellowish brown tomentum, dark brown tomentum posteriorly, hair on dorsum pale anteriorly, about half as long as the dark brown and more dense hair posteriorly; hair on the scutellum about as long as hair posteriorly on the thorax; pleurae grayish brown tomentose, vestiture pale.

Abdomen: Laterally the margins of tergites 1-7 brown pollinose, dorsum polished blue-black, without tomentose patterns; hair on lateral margins of tergites 1-3 abruptly longer than on tergites 4-7, yellowish hair, but brown on tergite 6.

Wings hyaline and broader apically than those of *phaeonotus*. Also, the latter has brownish wings.

Legs: Distal three-fifths of hind tibiae about the same diameter as the hind femora; dense short hair ventrally bright coppery to yellow, dorsally the long bristles and shorter hairs numerous.

FEMALE: Similar to the male; face yellowish brown tomentose, hair on face mostly white, with a few black hairs, longer black hairs along the oral margin; thorax laterally extensively gray pollinose; pleurae gray tomentose; laterally abdominal tergites 1 and 2 brown pollinose; hind tibiae ventrally with dense short hair more yellowish orange-brown than in male.

TYPE MATERIAL: Holotype, male, Highlands, North Carolina, 3800 feet, June 3, 1957 (J. R. Vockeroth). Allotype, female, same locality as holotype, June 3, 1957 (J. R. Vockeroth). Paratypes: Same locality as holotype, May 23 to June 7, 1957 (J. R. Vockeroth, W. R. M. Mason), 16 males, six females. *Connecticut:* Avon Old Farms, Avon, June 16, 1929 (C. H. Curran), one male. *Minnesota:* Houston County, May 24, 1936 (H. R. Dodge), one male. *New Jersey:* Ramsey, June 5, 1916 (J. Bequaert), one male. *New York:* Crugers, June 20, 1912, pair; Herkimer, August 8, 1921 (M. D. Leonard), one male; Mt. Kisco, May 27, 1930 (L. Lacey), one male; Oliveria, June 10, 1934 (H. Die-

trich), two females; Patterson, June 11, 1935, June 17, 1936, June 23, 1937, August 2, 1937 (Charles H. Martin), three males, seven females; Tuxedo, the Station for the Study of Insects, June 28, 1928 (C. H. Curran), one male; Yonkers, June 16, 1935 (H. Dietrich), one female, June 16, 1936 (L. L. Pechuman), one female. *Ohio*: Hocking County, Good Hope Township, Section 28, June 9, 1934 (E. S. Thomas), one female; Williams County, June 14, 1952 (H. V. Weems), one female. *South Carolina*: Myrtle Beach, April 23, 1929 (E. R. Kalmbach), one female. *Tennessee*: La Follette, Cumberland Mountains, May 27, 30, 1939 (R. M. Goslin), four males; Great Smoky Mountains National Park, June 7, 1942 (D. J. and J. N. Knull), one male. Holotype, allotype, and paratypes deposited in the Canadian National Collection. Paratypes are in the collections of the American Museum of Natural History, the United States National Museum, the Ohio State Museum, Cornell University, and of the writer.

Holopogon phaeonotus Loew

Figures 9, 15, 18, 21

Holopogon phaeonotus LOEW, 1874, Berliner Ent. Zeitschr., yr. 18, p. 366.

Holopogon phaeonotus, BACK, 1909, Trans. Amer. Ent. Soc., vol. 35, p. 315.

Holopogon tibialis CURRAN, 1923, Canadian Ent., vol. 53, p. 207. New synonymy.

In establishing the identity of *Holopogon phaeonotus* Loew, the writer has examined the female type at the Museum of Comparative Zoölogy. Since establishing the identity of *guttula*, there has been correspondence concerning the pollinose patterns on the abdominal tergites.

In addition to the study of the female type, another important key in establishing the identity of *phaeonotus* is a male specimen collected by the writer at La Grange, Texas, on April 10, 1953. Although more than 1600 specimens of *Holopogon* have been studied, this specimen and the type are the only known specimens of *phaeonotus* from Texas. I consider my male specimen as a topotype, although no specific locality in Texas is mentioned in the original description.

The identity of *Holopogon tibialis* Curran was established with the help of Dr. J. R. Vockeroth who compared a male specimen collected at Beach Grove, Quebec, with the type of *tibialis*. Also, Dr. C. H. Curran has lent to the writer a series of *tibialis* from Orilla, Ontario, and from Long Island, New York, that agree well with the compared specimen and with the Texas topotype in patterns of vestiture, pollinose patterns on the abdomen, the several characters of the hind tibiae, and the shape and color of the wings.

A study of about 700 specimens of *Holopogon* from the eastern United States and eastern Canada established the important diagnostic characters for four species from this area; half of these specimens belonged to one species. These latter specimens have been labeled by past students mostly as *guttula* (Wiedemann) and also a few as *tibialis* Curran and as *philadelphicus* Schiner. The last name is eliminated from consideration because of the hyaline wings. Elimination of the erroneous *guttula* determinations leaves *phaeonotus* and *tibialis* available as names for the abundant species. It is unfortunate that a recognizable species such as *tibialis* should become a synonym of an almost unknown species that was inadequately described from a female.

The following characters are important for the recognition of *phaeonotus*. The hind tibiae of the male are clothed ventrally and laterally with dense, dark brown hair and dorsally and laterally with numerous long, black bristles and strong hairs as well as with shorter black hairs. There is brown pollen on the lateral margins of each of the abdominal tergites of the male, and there are dorsal stripes across the anterior margins of tergites 4-6 of many specimens. Also, the wings are brownish, long, and narrowed at the tip. Many male specimens at hand from the eastern United States and Canada closely resemble the topotype of *phaeonotus*.

VARIATION IN *phaeonotus*

One of the difficulties in establishing the identity of *phaeonotus* is the variability of many characters within the species. Some of these variations are correlated with sex. For example the dense, short hair on the hind tibiae of the males is dark brown in any light. In the females this hair varies from a faded reddish brown to a bright orange reddish brown, and in some specimens includes a few yellow hairs; on the anterior side the hair is white. On some specimens the color of the dense hair changes with the light and the angle of view.

The color and the density of the pollen on the lateral margins of the thorax before and behind the transverse suture are generally associated with sex. In the males the pollen is pale and dense on the anterior side of the suture, while on the posterior side is a small wedge of dense pollen below a subshining, thinly pollinose area that extends posteriorad into a larger shining area. The color of the pollen just before the suture is a variable mixture of brown and gray granules. Brown granules completely or partially predominate in about two-thirds of the male specimens, while in the other third the granules are mostly gray or totally gray.

In the females this pollen is of equal density on both sides of the suture, but gray granules predominate and cover a much larger area than in the males. There are female specimens with the gray completely replaced by brown.

Some of the female specimens have the lateral margins of the thoracic dorsum broadly gray, with black hair predominating in the mystax. In other specimens with the same gray patterns the black hairs are confined to the oral margin.

In his description of *phaeonotus*, Loew did not mention the brown pollinose patterns on the lateral margins and the dorsum of several or more abdominal tergites. Also, Back does not mention these patterns. In the females the lateral margins of abdominal tergites 1-3 are brown pollinose, being successively narrower posteriorad. An occasional specimen has the entire margin of tergite 4 pollinose, or only small quantities are present. Usually tergite 4 is without pollen, and tergite 3 is frequently only partially pollinose anteriorly. Occasionally a female is found with a narrow band of pollen across the dorsum of tergites 4 and 5. The pollen seems to be easily abraded.

Abdominal tergites 1-7 of the males of *phaeonotus* are usually brown pollinose on the lateral margins, although in some there is only a small amount or none on the last of the posterior tergites. On many specimens the pollen along the lateral margin extends upward and near the anterior margin of the segment as a dorsal band or stripe that is variable in width. In others the dorsal bands are confined medially. The bands are more likely to be seen on tergites 5-7 than on tergites 3 and 4. In some lights at certain angles of view these bands disappear.

The antennae of *phaeonotus* are quite variable and are not reliable for identification.

DISTRIBUTION: Canada: Ontario; Quebec. United States: Connecticut; Florida; Georgia; Indiana; Kentucky; Maryland; Massachusetts; Michigan; New Jersey; New York; Pennsylvania; Rhode Island; South Carolina; Texas, the type locality; Tennessee; Virginia; Wisconsin.

Holopogon seniculus Loew

Figure 8

Holopogon seniculus LOEW, 1862, Berliner Ent. Zeitschr., yr. 7, p. 62.

Holopogon seniculus, BACK, 1909, Trans. Amer. Ent. Soc., vol. 35, pp. 315-316.

Most specimens of *Holopogon seniculus* Loew have a pure white vestiture, but some specimens have the hair showing various shades of

yellow. One of the distinguishing features of the lectotype specimen is the yellow wing veins. Many other specimens at hand have yellow veins, but a few have the yellow confined to the basal area of the wing, or the veins totally brown.

The scutellum shows considerable variation. Usually the entire disc, as in the two type specimens at hand, is brown tomentose. Also, some specimens have the disc entirely gray tomentose; others, brown, with a gray spot on the disc. On a few specimens the tomentum on the sloping portion and the margin are polished. Whether these characters are specific or subspecific in value could not be determined.

The lateral margin of abdominal tergite 1 is gray tomentose (rather than pollinose) on both the lectotype male specimen and on the cotype female. The dense hair on the lateral margin of tergite 2 obscures the margin, but on the female the margin is narrowly gray tomentose. The tomentum is not dense as on the thorax.

The hind tibiae gradually taper from the apex to the base, the apex being slightly larger or sometimes equal to the diameter of the hind femora. On the lectotype specimen the dense, short hair on the hind tibiae is white anteriorly and ventrally but yellow on the posterior side.

LECTOTYPE: Male, with these five labels: locality, "Neb."; a label with the number "144"; a "Loew, Coll." label; a red "Type" label, with the number "12811"; and a handwritten label with the word "*seniculus*." I have added a sixth label designating the specimen as the lectotype. This specimen is in the Museum of Comparative Zoölogy, Cambridge, Massachusetts.

The cotype specimen in Dr. F. R. Cole's possession at the University of California has the locality label "Neb.," the label "Loew, Coll.," and a red "Type" label, number "12811."

DISTRIBUTION: *Alberta*: Scandia, July 9, 1956 (F. E. Sterns). *Colorado*: Lamar, June 4-11. *Montana*: Prairie County, Montana Agricultural Experiment Station, July 24, 1922. *Nebraska*: Harrison, the type locality, July 15, 1923 (B. D. Wholan). *New Mexico*: White Sands, June 27, 1940 (R. H. Beamer). *Nevada*: Ten miles south of Fernley, June 13 (J. Wilcox, G. F. Toland); 39 miles east of Reno, June 12, 1952 (R. H. and L. D. Beamer). *North Dakota*: Richland County, Sand Dunes, June 26, 1954 (Edward S. Thomas). *Saskatchewan*: Bestville, July 5, 1923 (Kenneth M. King). *South Dakota*: Badlands, Interior, June 15, 1948 (H. C. Severin); Antelope Range, June 24, 1954 (H. C. Severin); Martin, July 6, 1924; Fox Ridge, June 28, 1947 (H. C. Severin). *Utah*: Manti, June 25, 1946 (G. F. Knowlton); Dugway

Proving Ground, Toole County, June 23, 1955 (J. L. Pastin). *Wyoming*: Lusk, August 26, 1895 (W. M. Wheeler).

Holopogon snowi Back

Holopogon snowi BACK, 1909, Trans. Amer. Ent. Soc., vol. 35, pp. 316-317.

Holopogon snowi, BROMLEY, 1934, Ann. Ent. Soc. Amer., vol. 27, p. 98.

Holopogon snowi, MARTIN, 1951, Kansas Ent. Soc., vol. 24, pp. 35-36 (designates lectotype).

The fact that the tibiae of all the legs are red separates this species from other *Holopogon* in the United States. Back based his original description on two females. The late R. H. Beamer sent a male to the present writer that was evidently from the original type series. This specimen was designated as a lectotype and is in the collection of the University of Kansas.

DISTRIBUTION: Type locality, Clark County, Kansas, 1692 feet, May 1892 (F. H. Snow). *Oklahoma*: Seiling, June 2, 1939 (Kaiser-Nailon). *Texas*: McLennan County, Texas, June 18, 1933 (H. B. Mills), reported by Bromley.

Holopogon stellatus, new species

Figures 2, 12

The face of the male of this species bears beneath the antennae a dark brown spot surrounded by white tomentum. This mark separates this species from the others. Only one male in more than 250 specimens did not have this spot. The species resembles *Holopogon albipilosus* Curran and has been labeled as that species. The thin tomentum on the thorax and the scutellum separates *stellatus* from *albipilosus*.

MALE: Length, 6 mm. Face black, white tomentose with a brown spot beneath the antennae, front subshining, dark brown tomentose, lighter brown tomentum below the ocellar tubercle, occiput shiny black, thinly brown pollinose; vestiture white except for the mystax which has black hairs along the oral margin, front with brown and pale hair with a yellow hue, black bristles on the antennae.

Thorax subshining brownish black, thinly brown pollinose from a dorsal view, median geminate pollinose stripe extending beyond the transverse suture; vestiture erect, fairly short, white hair anteriorly and brown hair posteriorly; pleurae gray pollinose; vestiture white; scutellum shining blackish brown, thinly brown pollinose, fairly long white hair along the margin and over the disc.

Abdomen shining black, abdominal tergite 1 thinly gray pollinose

laterally, tergite 2 grayish brown pollinose along the margin; tergites 1 and 2 laterally with tufts of white hair, tergite 3 with shorter, white hair on the anterior half and brownish on the posterior half, hair on the remaining tergites shorter, yellowish white below and brown above, abdominal disc with recumbent, dark brown hair somewhat shorter than laterally.

Wings hyaline, with violaceous reflections in some lights.

Legs black, hind femora with vestiture white; hind tibiae with pale bristles except black apically, short dense hair anteriorly pale yellow to brownish yellow, ventrally different shades of yellow, posteriorly dark brown to yellowish brown depending on angle of view.

FEMALE: Head black, face grayish white tomentose, vertex brown tomentose, gray below the ocellar tubercle and very narrowly along the margin of the eyes; hair on vertex pale yellow. Thorax with a median brown tomentose stripe, the margins fading into the paler tomentum that extends to the transverse suture; vestiture generally white; abdominal tergite 1 laterally thinly gray pollinose, tergite 2 laterally and anteriorly with a densely brown pollinose spot, posteriorly thinly grayish brown pollinose. Vestiture of hind tibiae yellowish orange.

TYPE MATERIAL: Holotype, male, Mt. Palomar, San Diego County, California, June 27, 1958 (Dorothy W. Martin). Allotype, female, same data as holotype. Paratypes: *British Columbia:* Vernon, July 28, 1938 (Hugh Leach), one male; Robson, August 4, 1950 (H. R. Foxlee), one male. *California:* Alpine County, Hope Valley, July 9, 1948 (P. D. Hurd, J. W. MacSwain), three females; Inyo County, Mazourka Canyon, July 2, 1953 (J. W. MacSwain), two males, two females, (W. D. McLellan), two females; Los Angeles County, Camp Baldy, July 11, 1950 (M. J. Stebbins), one male; Mono County, Convict Lake, July 27, 1957 (J. Wilcox), two males; Laurel Creek, Y. M. C. A. camp road, August 8, 1957 (Dorothy W. Martin, Charles H. Martin), nine males, 27 females; Leavitt Meadows, July 6, 1951 (E. L. Silver), one male; Monterey County, Bradley, May 22, 1920 (E. P. Van Duzee), two males, one female; Pleyto, May 22, 1920 (E. P. Van Duzee), one female; Nevada County, Boca, June 28, 1954 (R. M. Bohart), one male, July 3, 1954 (P. D. Hurd), one female, July 3, 1955 (E. I. Schlinger), one male; 7 miles southwest of Truckee, June 15, 1951 (E. I. Schlinger), one male; Truckee, July 5, 1936 (A. E. Pritchard), three males, one female; Blue Canyon, June 15, 1951 (E. I. Schlinger), one male; Sagehen, near Hobart Mills, June 25, 1954 (R. M. Bohart), one male, (P. D. Hurd), two males, one female, (G. A. Schaefers), one

male; Placer County, Cornelian Bay, Lake Tahoe, July 22, 1957 (R. M. Bohart), five males, three females; Lakeside, Lake Tahoe, June 30, 1927 (J. M. Aldrich), one male; Plumas County, Johnsonville, July 8, 1954 (R. C. Blaylock), one male; Riverside County, San Jacinto Mountain, June 13, 1929 (E. S. Ross), one female; San Bernardino County, South Fork Camp, 6000 feet, July 3, 1942, July 4, 1943 (J. Wilcox, H. Hollingsworth), 16 males and females; San Diego County, Mt. Palomar, June 27, 1958 (Dorothy W. Martin, Charles H. Martin), 68 males and females, July 13, 1941 (J. Wilcox), 34 males and females; Laguna Mountain, July 6, 1941 (John Wilcox), one female; Jacumba, May 13, 1953 (Charles H. Martin), two females; Toulumne County, Dardanelles, July 2, 1957 (J. W. MacSwain), two females; Yosemite Valley, June 15, 1921 (E. C. Van Dyke), two females. *Nevada*: Sparks, June 28, 1927 (E. P. Van Dyke), one female. *Oregon*: Deschutes River near Terrebonne, July 20, 1941 (Schuh and Gray), two males; Hart Mountain, Lake County, August 1, 1932 (D. K. Frewing), one male. *Washington*: Tieton, July 4, 1933 (Itol Wilcox), two females. Holotype, allotype, and paratypes deposited in the American Museum of Natural History. Paratypes are in the following collections: University of California at Davis and at Berkeley, California Academy of Sciences, United States National Museum, Cornell University, University of Kansas, J. Wilcox's, and the writer's.

REMARKS: There is considerable variability within this most common and widespread species on the Pacific coast. Some specimens may not trace through the key because of their extreme variation. The spot on the face of the male varies from a very small area to one that almost covers the face. Usually the spot is not on the females but occasionally one has it. The vertex of most females is some shade of reddish brown, with a gray spot below the ocellar tubercle. The extent of this spot is variable; in some specimens it covers the entire vertex and crowds out any traces of the reddish brown tomentum. On the males this gray spot is a brown that is much paler than the remaining tomentum. There is a tendency in both sexes for the hair on the vertex to have a yellow hue that is faint in some specimens, in others intense.

Some specimens of both sexes have yellowish to yellowish red hair on the abdomen.

The bristles on the hind tibiae may be totally white, totally black, or mixed. The vestiture of the hind tibiae is orange-yellow on some specimens.

The wings vary from a hyaline to dark brown color, the basal por-

tion being the darkest and the wings of the female being darker than those of the male. In some specimens there is a distinct whitish cast in the wings. In the series collected in 1958 on Mt. Palomar some of the specimens of both sexes have white veins basally.

Usually *Holopogon* perches on the end of a dead twig several feet above the ground. Along Laurel Creek, Mono County, California, *Holopogon stellatus* was found within a few inches of the ground on dead twigs of sage brush. Also, several specimens were swept out of the grass along the stream. This species has been found also perching on annuals as well as on shrubs and trees of various species. In such cases they were several feet off the ground.

***Holopogon vockerothi*, new species**

Figure 6

The thoracic, densely tomentose, median, broad, geminate stripe in various shades of brown and outlined by lateral, broad, subshining black stripes and a narrow median, subshining, black stripe separates *Holopogon vockerothi* from other species. There are two other species that might be collected with *vockerothi*; these are *phaeonotus* and *oriens*. Both species have median brown stripes on the thorax, but the stripes are outlined by tomentum of a paler color.

MALE: Length, 7 mm. Head black; face with dense, yellowish brown tomentum, front and vertex more thinly yellowish brown tomentose, with a lighter spot below the ocellar tubercle, occiput thinly brown tomentose to pollinose, tomentum more dense around the margins of the eyes; mystax mostly blackish brown, with some pale hair, hair on front, vertex, and upper occiput blackish brown, hair on ocellar tubercle and lower occiput white, occipital hair long, extending approximately half of its length over the margin of the eye.

Thorax brown tomentose, with the geminate median stripe separated by a narrow, subshining line and outlined by subshining, lateral, black stripes, pale tomentose spots laterally before the transverse suture; hair of the dorsum as long as the antennal style, thinner medially than laterally, longer posteriorly than anteriorly, brown except pale laterally and along the anterior margin; scutellum densely brown pollinose, hair long, medium dense; pleurae a lighter brown tomentose than the dorsum, some gray tomentum, hair somewhat long, sparse, white.

Abdomen blue-black, shining; tergite 1 laterally broadly brown pollinose, tergite 2 laterally brown pollinose, tergite 7 brown pollinose anteriorly, hair on lateral margin of abdomen gradually shortening

posteriorad, brown hair on dorsum relatively long, reclinate, hair on the venter about as long as the hair on the lateral margin of its respective segment.

Wings hyaline, very slightly tinged with sparse, brown microtrichia; long hairs at base of costal vein pale.

Legs: Hind femora with apical half of dorsal surface with sparse, reddish brown, recumbent hair, basal half with white, erect hair; hind tibiae gradually tapering from the apex to the base, dorsal surface with numerous semi-erect hairs and bristles, dense short hair orange-yellow ventrally, dark reddish brown anteriorly and posteriorly.

FEMALE: Face, front, vertex gray tomentose, with a brownish hue, vestiture of head mostly white, with black hairs in the mystax, on the antennae, and occiput; thorax with a median, rather dense tomentose brown stripe outlined anteriorly by grayish white tomentum and medially by subshining black stripes, calli gray tomentose, more pale hair anteriorly on thorax; abdominal tergite 1 laterally densely gray tomentose, tergite 2 laterally grayish brown tomentose along the margin; longest hair on tergites 1 and 2, shorter and more sparse on the remaining segments; hair on the dorsal surface of the hind femora white, the dense, short hair on the hind tibiae yellow ventrally, anteriorly pale brown, changing to white in some lights, posteriorly bright brownish orange-yellow.

TYPE MATERIAL: Holotype, male, Orilla, Ontario, June 13, 1925 (C. H. Curran). Allotype, female, same data. Paratypes: Same data as holotype, 14 males, six females, June 12, two males, four females, June 14, a pair *in copula*, June 26, 1926 (C. H. Curran), two males, June 28, 1927 (C. H. Curran), one female. *Manitoba*: Aweme, June 5-17, 1925 (N. Criddle), four males, two females, June 18-23, 1927 (N. Criddle), five males, one female, June 8, 1923 (R. M. White), one male, July 28 (R. M. White), one male, July, 1910 (P. N. Vroom), one female, June 2, 1926 (R. D. Bird), one female; Onah, June 15, 1924 (R. D. Bird), one female. *Ontario*: Simcoe, June 5-6, 1939 (G. E. Shewell), four males, two females, June 14-20, 1939 (G. E. Shewell), one male, one female; Norway Point, Lake of Bays, June 22-26, 1921 (J. McDunnough), one male; Blackburn, June 24, 1954 (R. Lambert, D. Cobb), two females; Mer Bleue, June 2, 1938 (A. Brooks), two females, (G. E. Shewell), one male; Leamington, June 8, 1937 (G. S. Walley), two females, June 7, 1929 (G. S. Walley), one male; Grand Bend, July 7, 1939 (G. E. Shewell), one female; Strathroy, June 27, 1917 (H. G. Crawford), one male; Merivale, May 30, 1952 (R. S. Bigelow), one male; Caradoc, July 3, 1918 (H. F. Hudson), one male,

one female. *Connecticut*: Avon Old Farms, Avon, June 20, 1929 (C. H. Curran), one female. *Georgia*: De Witte, Mitchell County, April 13, 1915 (C. S. Spooner), one male, one female. *Illinois*: Forest City, May 21, 1953 (J. F. McAlpine), one male, one female. *Michigan*: Crawford County, June 21, 1953 (R. R. Dreisbach), one male; Bear Lake, June 12, 1940 (C. W. Sabrosky), one female; Shelby, June 19, 1940 (C. W. Sabrosky), one male. *Minnesota*: Anoka, June 23, 1936 (A. E. Pritchard), two males, three females; Findley, July 1, 1937 (A. E. Pritchard), one female. *New York*: Peru, Clinton County, June 8, 10, two males, one female; Trenton Falls, June 8, 1921 (M. D. Leonard), one female; Herkimer, August 8, 1921 (M. D. Leonard), one male; Cold Brook, June 22, 1940 (H. Dietrich), one male. *Wisconsin*: Tower Hill State Park, June 1, 1935 (H. R. Dodge), two males, one female. Holotype, allotype, and paratypes deposited in the Canadian National Collection. Also, paratypes are in the collections of the American Museum of Natural History, Cornell University, University of California at Davis and Berkeley, and the writer.

REMARKS: The long, white pile on the first two abdominal tergites of the male is a constant character in the series at hand. The color of the hair on the lateral margins of tergites 3-7 is either totally dark reddish brown, or dark reddish brown mixed more or less with white hair.

Several specimens are at hand that cannot be positively identified as this species, because the thorax is coated with some material that obscures the median stripe. One such specimen from Badlands, Interior, South Dakota, June 15, 1948 (H. C. Severin) seems to be *vockerothi*. The other specimens are from Quebec and Illinois.

***Holopogon wilcoxi*, new species**

The scutellum of *Holopogon wilcoxi* is pollinose on the anterior flattened disc and polished on the posterior rounded portion of the disc. The posterior tibiae are slender, being more nearly the diameter of the femora than in many species. The slender tibiae relate *wilcoxi* to *seniculus* Loew, the latter having more robust though still slender hind tibiae.

MALE: Length, 6 mm. Head black, face gray tomentose, with a brownish hue, front and vertex more thinly gray tomentose, occiput subshining black, thinly brown pollinose; vestiture white except for darkened hair on the front and on the vertex.

Thorax black, median, thin, brown, pollinose, geminate stripe confluent with the lateral brown pollinose stripes, anteriorly yellowish

gray triangular spots beside the median stripe; scutellum with a triangular spot of brown tomentum anteriorly and polished posteriorly, hair sparse, pale; pleurae thinly brown pollinose, hair pale.

Abdomen blue-black, polished, tergite 1 laterally thinly gray pollinose, tergite 2 laterally very narrowly brown pollinose; hair on the lateral margins pale, becoming successively shorter from segment to segment posteriorad, sparse on the posterior segments.

Wings hyaline, veins brown.

Legs black, vestiture pale except for a few bristles, short, dense hair on the hind tibiae yellow; largest diameter of the hind tibiae not much greater than that of the femora.

FEMALE: Similar to the male except that the pollinose markings on the thorax are more extensive.

TYPE MATERIAL: Holotype, male, San Carlos Lake, Arizona, May (D. K. Duncan). Allotype, female, same data as for holotype. Paratypes: Same data as for holotype, 21 males and females. *Arizona*: San Carlos Lake, May 21, 1935 (F. H. Parker), one male, May 17, 1936 (F. H. Parker), five males, five females; Globe, May 16, 1934 (F. H. Parker), 14 males and females; wheat field near Globe, May 15, 1932 (D. K. Duncan), one female; Roosevelt Lake, May 30 (D. K. Duncan), four males, four females; Globe, Pinal Creek, June 7, 1953 (A. and H. Dietrich), three males, two females; base of Pinal Mountains, June 12, 1944 (D. K. Duncan), one male; White Mountains, June 14, 1950 (Lucy D. Beamer), one female, September (D. K. Duncan), one female; Carrizo, June 30, 1949 (Dorothy W. Martin), one female; McNary, August 9, 1948 (Dorothy W. Martin), one female; 24 miles west of Cameron, July 3, 1952 (R. H. and L. D. Beamer and others), one female; Sedona, July 2, 1949 (J. Wilcox), one male; Oak Creek Canyon, July 9, 1941 (Burt Hodges), one male, (R. H. Beamer), one male. The holotype and allotype are in the collection of J. Wilcox, San Gabriel, California. Paratypes are in the collections of the American Museum of Natural History, University of Kansas, Cornell University, University of California at Davis and Berkeley, J. Wilcox, and the writer.

DASYHOLOPOGON, NEW SUBGENUS

In general, the three species placed in this subgenus are more shaggy in appearance than most specimens of *Holopogon*. Also, the lack of bristles laterally before the transverse suture on the thorax and the long, dense hair on the ventral surfaces of the posterior abdominal sternites separate the subgenus *Dasyholopogon* from *Holopogon*. The male genitalia closely resemble those of *Holopogon*, so that beyond

doubt *Dasyholopogon* is very closely related. The species belonging to *Dasyholopogon* are found in California, Oregon, and Idaho.

GENOTYPE: *Holopogon umbrinus* Back.

KEY TO THE SPECIES OF *Dasyholopogon*

- 1. Abdominal tergites 3-5 dorsally with a patch of recumbent, very short, reddish brown tomentum in both sexes (California) *umbrinus* Back
- Abdominal tergites dorsally without tomentum 2
- 2. Long hair on the lateral margins of the abdominal tergites rather abruptly shorter posteriorly on the male; hair of the occiput extends only a short distance over the margin of the eyes (Idaho, Oregon).....
- *caesariatus*, new species
- Long hair on the lateral margins of the abdominal tergites more nearly uniform in length; hair of the occiput extends half of its length over the margin of the eyes (California) *crinitus*, new species

Holopogon (*Dasyholopogon*) *caesariatus*, new species

The polished dorsum of the tergites of *caesariatus* separates it from *umbrinus*, which has a patch of brown tomentum on the dorsum of some of its tergites. In *caesariatus* the hair of the occiput extends only a short distance over the margin of the eyes, while in *crinitus* the hair extends half of its length over the margin of the eyes. Where the compound eye joins the rim of the occiput, the curve of the eye of *caesariatus* is highly rounded, while in *crinitus* the curve of the eye is flatter.

MALE: Length, 7 mm. The head black, the face light brownish gray tomentose, the front and vertex brown tomentose, with a lighter spot below the ocellar tubercle, the occiput subshining, thinly brown pollinose, the vestiture blackish brown except for pale hair on the ocellar tubercle and on the lower fourth of the occiput.

Thorax subshining, very thinly brown tomentose, narrowly pale light brown tomentum along the anterior margin separated by a median, dark brown, tomentose area, a crescent of pale tomentum before the transverse suture that can be seen only from above; fairly long, fine, dense, reddish brown hair, with patches of white along the anterior margin and on the calli, and on the posterior calli; scutellum brown tomentose, with long, dense, reddish hair mixed ventrally with a few white hairs; the pleurae mixed gray and brown tomentose, the vestiture pale.

Abdomen shining black; tergite 1 laterally thinly brown pollinose, tergites 7 and 8 dorsally brown pollinose, posterior margins narrowly shining, the remaining tergites polished; tergite 1 laterally with a tuft of white hair on the anterior corner about half as long as the longer

hair on the posterior half, tergite 2 laterally with long, white hair becoming shorter posteriorad, tergite 3 laterally with the anterior hair as long as the posterior hair on tergite 2, and the posterior hairs slightly longer than the reddish brown hair on tergites 4-7, dorsally relatively long, suberect, brown hair, on each segment ventrally the hair similar to that on the lateral margins in both length and color.

Wings faintly tinged with brown, hyaline in some lights.

Legs: Hind femora dorsally with recumbent, mixed white and reddish brown hair; hind tibiae with the heaviest bristles on the antero-ventral surface, remaining bristles weaker and much longer, reddish brown pubescent ventrally and posteriorly reddish brown, antero-ventrally white pubescent, with a mixture of reddish brown.

FEMALE: Similar to the male; abdominal tergite 2 thinly brown poliose; abdominal tergites laterally with the longest hair on tergites 1 and 2, hair of about equal length on the remaining segments, white on tergites 1-3, mixed white and brown hair on tergites 4-6, with more brown hair posteriorad, hair on dorsum much shorter than on the male, suberect, ventrally hair as long as the hair on the lateral margins but thinner; wings darker brown than those of the male.

TYPE MATERIAL: Holotype, male, Alpha, Long Valley, Idaho, July 6, 1934 (Dorothy W. Martin). Allotype, female, same data. Paratypes: *Idaho*: Alpha, Long Valley, July 8, 1934 (Dorothy W. Martin, Charles H. Martin), six males, five females, and June 9, July 1, 17, 25, 1934 (Dorothy W. Martin, Charles H. Martin), six females, two males; Spencer, Targhee National Forest, July 17, 1934 (Dorothy W. Martin, Charles H. Martin), four females, one male. *Oregon*: Pringle Falls, 9 miles west of La Pine, Deschutes County, August 26, 1957 (Gerald F. Kraft), two males; Summit, Prairie, August 9, 1939 (Gray and Schuh), two males, two females; Deschutes River Bridge, south of Tumalo, July 18, August 12, 25, 1946 (Charles H. Martin), eight females, four males, July 13, 1948 (Charles H. Martin), three males, one female; Deschutes River near Terrebonne, July 10, 1941 (Schuh and Gray), one male; Bull Prairie, Lake County, July 23, 26, August 13, 1932 (D. K. Frewing), 17 males, 26 females. *Utah*: Logan Canyon, August 1, 1937 (G. F. Knowlton, C. J. Davis), one male. Holotype, allotype, and paratypes deposited in the American Museum of Natural History. Paratypes are in the collections of the United States National Museum, the University of California at Davis and Berkeley, Cornell University, University of Kansas, J. Wilcox, and the writer.

REMARKS: The coloration of this species is rather variable, and the available data indicate the possibility of a stability of color in local

situations. For example, all the vestiture of the specimens collected at the Deschutes River Bridge, Tumalo, Oregon, was almost totally pale except for a few black hairs. This was true for the specimens collected in 1946 and in 1948. In 1958 John Lattin collected a single female in the same area that was also pale haired. An almost totally pale-haired specimen was collected at Terrebonne, Oregon. The two specimens collected near Pringle Falls, Oregon, were marked like the holotype from Idaho in that posterior tergites 4-7 were laterally brownish black haired. The 17 males collected at Bull Prairie, Oregon, had abdominal tergites 3-7 laterally black haired. All these specimens were similar in other respects.

All the males of *caesariatus* have abdominal tergites 7 and 8 dorsally brown tomentose to pollinose, with the posterior margins rather narrowly polished. On a few specimens, particularly those from Bull Prairie, Oregon, a tomentose pattern can be seen with $\times 72$ magnification on some of the tergites. On the better marked specimens there is medially and dorsally on abdominal tergites 5 and 6 a patch of thin tomentum, while on tergites 3 and 4 there is a narrow, brown tomentose band along the anterior margins. On most specimens these tomentose marks either are completely missing or only traces of them can be seen. For this reason only *umbrinus* is mentioned in the key as being tomentose on the abdominal tergites.

While the writer collected all his specimens at the Deschutes River Bridge, Tumalo, off dead juniper twigs, Lattin collected his single specimen off sage brush. The specimens collected in Idaho were on dead willow twigs at Spencer and dead alder twigs in Long Valley.

Holopogon (*Dasyholopogon*) *crinitus*, new species

A blackish brown, long-haired species that is closely related to *Holopogon* (*Dasyholopogon*) *umbrinus* Back, but there is no tomentum on the abdominal tergites. Also, the hair on the dorsum of the abdomen is shorter on *crinitus* than on *umbrinus*. The species *crinitus* is found in southern California, while *umbrinus* is found in central and northern California.

MALE: Length, 7 mm. Head shining black, face yellowish brown tomentose, front thinly brown pollinose, with a spot of yellowish brown tomentum below the ocellar tubercle, occiput very thinly brown pollinose; vestiture blackish brown except for the white hair on the ocellar tubercle; apical four-fifths of the third antennal segment narrower than the bulbous basal fifth, slightly swollen near the apex.

Thorax shining black, thinly brown tomentose, long, dense, crinkly, dark brown hair; scutellum shining black, thinly brown tomentose, margin and disc with hair similar to the thoracic hair in color and in length; pleurae shining black, very thinly brown tomentose, relatively sparse, long, dark brown hair.

Abdomen shining black, laterally and ventrally with long, dense, black hair, dorsally hair shorter, erect.

Wings brown.

Legs: Hind femora dorsally with rather dense, recumbent, short, mixed white and brown hair, brown hair laterally but not recumbent; hind tibiae dorsally with numerous black hairs and bristles, short, dense hair reddish brown anteriorly and posteriorly, yellow ventrally.

FEMALE: Similar to male; hair not so erect on the thorax, pale hair anteriorly and laterally on the thorax, with light patches of tomentum anteriorly; hair on venter long but more sparse than on the male, lateral hair shorter than on the male, tergites 1 and 2 with pale hair, tergite 1 laterally thinly brown pollinose, tergite 2 with the margin narrowly brown pollinose. Wings more hyaline than in the male.

TYPE MATERIAL: Holotype, male, Big Bear Lake, Hanna Flats, California, July 31, 1949 (Charles H. Martin). Allotype, female, same data. Paratypes: *California*: Same data as the holotype (Dorothy W. Martin), one female; Dollar Line Trail, San Bernardino Mountains, July 11, 1956 (R. M. Bohart), two females, (R. C. Bechtel), one female; Idyllwild, San Jacinto Mountains, July 6, 1950 (F. X. Williams), one female; Idyllwild, June 30, 1928 (E. C. Van Dyke), one male, one female; San Jacinto Mountains, Tahquitz Valley, April 14, 1930 (E. S. Ross), one male, July 7, 1950 (E. G. Linsley), one male, July 1, 1952 (R. E. Wagner), one female. The holotype and allotype are deposited in the American Museum of Natural History. Paratypes are in the collections of the University of California at Davis and at Berkeley, and of the writer.

Holopogon (Dasyholopogon) umbrinus Back

Holopogon umbrinus BACK, 1909, Trans. Amer. Ent. Soc., vol. 25, p. 317.

Holopogon (Dasyholopogon) umbrinus differs from the two closely related species, *crinita* and *caesariatus*, in having dark brown tomentum on the dorsum of the abdomen. The tomentum on abdominal segments 3-6 of the female is more easily seen than on the male, because the hair in the tomentose area is more sparse. On well-marked females the tomentose bands cover anteriorly about two-thirds of the width of the abdominal tergites. The tomentum is invisible at certain

angles. On some specimens only small amounts of tomentum, or none, can be seen because of grease or abrasion.

On the male the dark brown tomentum on well-marked specimens is more abundant laterad on abdominal tergites 1 and 2, while on tergites 3-7 the bands extend uniformly across the dorsum but do not encroach on the lateral margins. Because the hair in the area occupied by the tomentum is more dense than on the female, it is more difficult to see than on the females. Frequently the tomentum is more easily found by looking down on the specimen at an angle with $\times 72$ magnification.

Back described *Holopogon umbrinus* on the basis of a single black female collected on July 25 at Webber Lake, Sierra County, California, remarking that the species was "very pilose" and that the pile is "dense on the venter of the abdomen from tip to base" and "wholly black." On the basis of 25 specimens at hand the description fits the males better than the females. The 18 females have white to yellow to orange-yellow long hairs on the lateral margins of tergites 1-4 on most specimens and on tergites 1 and 2 of one specimen. The female specimen at hand from the type locality has all the abdominal segments with yellowish hair and a few black hairs posteriorly. There are brown pollinose marks on the lateral margins of tergites 1 and 2 that, in some specimens, are almost obscured by the thinness of the pollen and by the density of the long hair on these segments.

The male has not been described. Back's description applies very well to the male specimens at hand. In general the hair is much more dense than on the females and is more extensively black. The pollinose markings on the lateral margins of the abdomen are similar to those of the females.

DISTRIBUTION: The distribution of *umbrinus* seems to be restricted to the higher elevations of California mountains ranging from Shasta County in northern California to Tulare County in central California. *Holopogon crinitus* apparently replaces *umbrinus* at the higher elevations in southern California mountains, while *caesariatus* replaces it to the north in Oregon and Idaho. *California:* Amador County, 4 miles north of Silver Lake, July 25, 1955 (E. I. Schlinger); Eldorado County, Echo Summit, August 4, 1957 (T. R. Haig); Strawberry Valley, August 9-10, 1912 (E. C. Van Dyke); Fresno County, Huntington Lake, 7000 feet, July 28 (E. P. Van Duzee); Mono County, Leavitt Meadows, June 28, 1951 (J. W. MacSwain); Nevada County, Sagehen, near Hobart Mills, July 9, 1954 (R. M. Bohart); Placer County, Bayview Camp, Lake Tahoe, July 24, 1955 (E. I. Schlinger); Shasta County,

Lake Eiler, July 22, 1947 (C. A. Hanson); Sierra County, Webber Lake, July 5, 1951 (E. I. Schlinger), type locality; Tulare County, Giant Forest, July 13, 1923 (E. P. Van Duzee), August 9–13, 1927, 6400–7000 feet (J. C. Bradley); Sequoia National Park, July 22, 1953 (A. N. and H. Dietrich); Tuolumne County, Elizabeth Lake, July 14, 1949 (L. L. Jensen), Pinecrest, July 9, 1947 (P. H. Arnaud), Tuolumne Meadows, August 19, 1954 (J. W. MacSwain), Dardenelles, July 26, 1951 (J. W. MacSwain).

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